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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,100	04/16/2004	Seiichi Kondo	501.36636CC3	7722

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EXAMINER
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TRAN, BINH X

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 06/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/825,100	<b>Applicant(s)</b> KONDO ET AL.	
	<b>Examiner</b> Binh X. Tran	<b>Art Unit</b> 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 March 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 10 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12 and 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09182,438.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>4-16-04</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Species A (claims 1-9, 12-13) in the reply filed on 3-21-2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 10-11 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 3-21-2006.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1-9, 12-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 8-9 of claim 1, "wherein a strength of said rendering said first part of water-soluble is stronger than a strength of said oxidizing said first part" is vague and indefinite. It is unclear from the claim what specific "strength" that applicants refer to.

Claims 2-9, 12-13 are indefinite because they directly or indirectly depend on indefinite claim 1.

### *Claim Rejections - 35 USC § 103*

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5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-9, 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. (US 6,126,853) in view of Small et al. (US 6,117,783).

Respect to claim 1, Kaufman discloses a method for manufacturing semiconductor device comprising the step of:

oxidizing a first part of a metal (i.e. passivation film col. 5 lines 33-45, col. 6 lines 10-15);

forming film forming agents (or inhibiting layer) on a second part of the metal film (col. 6 lines 22, col. 11 lines 10);

dissolution the first part, which is oxidizing in said oxidizing, after said oxidizing and said forming (col. 10 line 35 to col. 11 line 15, Fig 1-2, read on "rendering said first part, which is oxidized in said oxidizing, water-soluble);

removing said inhibitor formed on said second part after said oxidizing and said forming (col. 6 lines 23-27).

Kaufman fails to disclose the strength of the dissolution the first part water soluble is stronger than the strength of said oxidizing the first part. In a semiconductor process, Small discloses both oxidizing the metal layer into metal oxide (copper oxide) and rendering the first part water-soluble ( $\text{Cu}^+$ ). Small further discloses the oxidation potential (Ev) of the rendering the first part of water-soluble (i.e. corrosion region) is stronger than the potential of said oxidizing part (col. 7, See Fig 1). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kaufman in view of Small by having the strength of said rendering the first part water-soluble stronger than the strength of the oxidizing part because this technique allow the selectivity of the polishing rate of one metal significantly greater than another metal or metal oxide (col. 7 lines 43-46).

Respect to claims 2, both Kaufman and Small teaches the metal film comprises copper, or copper alloy (Kaufman's example 1-2; Small's col. 7). Respect to claims 3-4, Kaufman teaches the inhibitor is benzotriazole (BTA, col. 6 lines 20-22) at the concentration of 0.01 to 0.1 weight percent (col. 13 lines 62-64). Respect to claim 5, Kaufman disclose the inhibitor on the second part of the metal film includes a surfactant (col. 6 line 66 to col. 7 line 11). Respect to claim 6, Kaufman disclose using hydrogen

peroxide to oxidize the first part of the metal film (col. 5 lines 46-67, col. 10 lines 65-67). Respect to claim 7-9, Kaufman disclose to use organic acid including citric acid, lactic acid, tartaric acid, acetic acid to disturb the metal oxide layer (See col. 6 lines 32-40).

Respect to claim 12-13, Kaufman discloses the semiconductor device has a first metal comprises copper and the second metal comprises titanium wherein the etch rate of the copper layer is faster than the etch rate of the titanium layer (Last two examples in Table 1, read on "the speed of rendering said first metal layer water soluble is fast than the speed on rendering said second metal layer water soluble).

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*Binh Tran*

Binh X. Tran